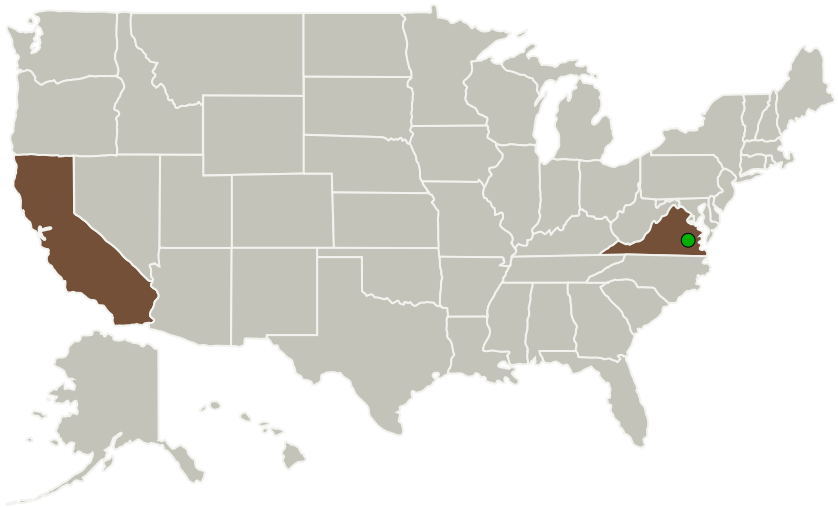
Interferometric Correlator for Acoustic Radiation & Underlying Structural Vibration (ICARUSV), Phase II

Completed Technology Project (2016 - 2018)

Project Introduction

Current methods for identification of aircraft noise sources, such as near-field acoustical holography and beam forming techniques, involve the use of pressure probes or microphone arrays to measure the radiated sound field. However, those techniques are intrusive, bandwidth limited, time consuming to implement, require extensive data processing and the resulting data may ultimately generate false results in the form of pseudo (noise) sources. Advanced Systems & Technologies Inc. proposes an optical non-contact sensor fusion concept which, for the first time, enables direct capture and observation of full-field non-stationary dynamic structural vibrations (SV) and unsteady radiated sound fields or transient flow fields around the structure of interest. SV depict the flow of energy in a structure and provides an unambiguous identification of structural noise sources and sinks. Additionally, the ability to capture and correlate the acoustic/flow field data with the structure borne intensity, offers an unprecedented and rapid diagnostic capability for noise source characterization and evaluation of noise abatement systems. In addition to being non-intrusive the measurements are fast, can be made at operationally relevant bandwidths, which extend to the ultrasonic domain, and provide deeper insight into the complex structural dynamics which are the root cause of noise emission.

Primary U.S. Work Locations and Key Partners



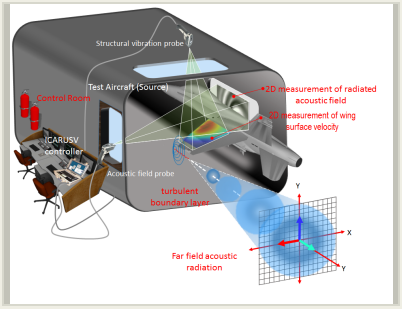


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Table of Contents

Small Business Innovation Research/Small Business Tech Transfer

Interferometric Correlator for Acoustic Radiation & Underlying Structural Vibration (ICARUSV), Phase II

Completed Technology Project (2016 - 2018)

Organizations Performing Work	Role	Type	Location
Advanced Systems & Technologies, Inc.	Lead Organization	Industry	Irvine, California
Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
California	Virginia

Project Transitions

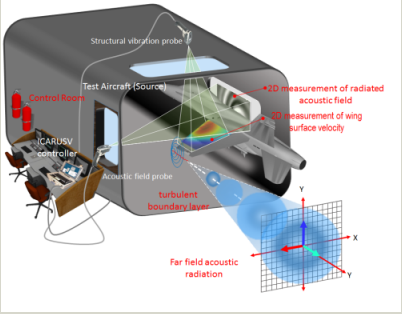
April 2016: Project Start

August 2018: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/139795)*

Images



Briefing Chart Image
Interferometric Correlator for Acoustic Radiation & Underlying Structural Vibration (ICARUSV), Phase II
(https://techport.nasa.gov/image/130046)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Advanced Systems & Technologies, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Vladimir Markov

Co-Investigator:

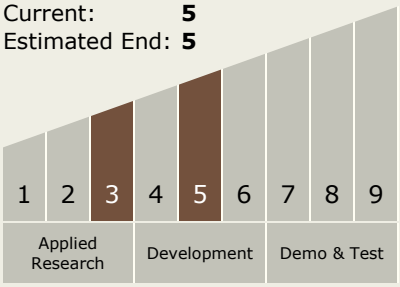
Vladimir Markov

Interferometric Correlator for Acoustic Radiation & Underlying Structural Vibration (ICARUSV), Phase II

Completed Technology Project (2016 - 2018)

Technology Maturity (TRL)

Start: **3**
Current: **5**
Estimated End: **5**



Technology Areas

Primary:

- TX15 Flight Vehicle Systems
  - TX15.1 Aerosciences
    - TX15.1.4 Aeroacoustics

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System